Small Business Technology TRansfer

Robust Exhaust Gas Sensing System Using Advanced Thin Film Chemical Sensors

Makel Engineering, Inc.
Chico, CA

INNOVATION

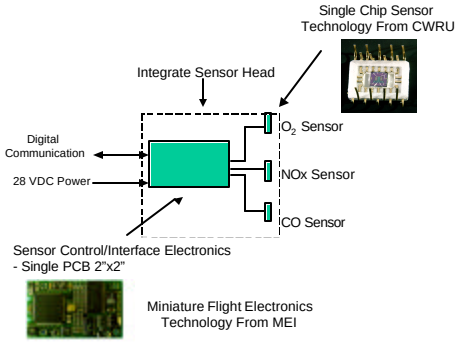
Low cost, miniature, MEMs based chemical sensor system for monitoring key exhaust species. (Oxides of nitrogen – NOx, carbon monoxide – CO, oxygen – O_2)

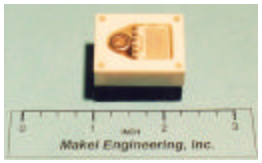
ACCOMPLISHMENTS

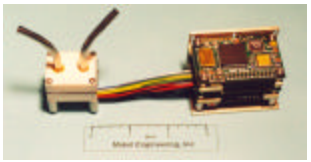
- Prototype Micro Electro Mechanical Systems (MEMS) sensor module demonstrated with full integrated "smart sensor" electronics
- Bench and feasibility testing successfully completed
- Sensor system performance demonstrated in engine testing conducted with gas turbine engine
- Partnered with Case Western Reserve University

COMMERCIALIZATION

- Testing planned with a manufacturer of large stationary gas turbines and manufacturer of microturbines for distributed power generation
- Joint development agreement with a major Ohio based fuel products OEM for application to exhaust measurements in reciprocating engines
- Production facility to support production up to 20,000 units per year, is under construction
- Phase III funding of $170K from NASA Glenn







GOVERNMENT/SCIENCE APPLICATIONS

- Jet engine emissions monitoring for NASA
- Arnold Engineering and Development Center/U.S. Air Force for performance measurements (thrust and combustion efficiency) in exhaust of vectored jet engines with afterburner
- EPA and DOE for NOx measurements of diesel engines
- Potential application to indoor air quality monitoring in buildings and vehicles

Glenn Research Center
Instrumentation and Controls
3-070

1998 Phase II, NAS3-00107, 4/01
NASA Contact – Mr. Gus Fralick
Company Contact – Dr. Darby Makel